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**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

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<b>Office Action Summary</b>	<b>Application No.</b> 10/534,312	<b>Applicant(s)</b> MALCOLM, PETER BRYAN	
	<b>Examiner</b> SON T. HOANG	<b>Art Unit</b> 2165	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 03 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 09 May 2005.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1-80 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-80 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 05 September 2005 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All    b) ☐ Some \*    c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)            | 4) <input type="checkbox"/> Interview Summary (PTO-413)           |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)   | Paper No(s)/Mail Date. _____                                      |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date <u>See Continuation Sheet</u> .                                  | 6) <input type="checkbox"/> Other: _____                          |

Continuation of Attachment(s) 3). Information Disclosure Statement(s) (PTO/SB/08), Paper No(s)/Mail Date :10 October 2006, 8 January 2007.

### **DETAILED ACTION**

1. This instant application having Application No. 10/534,312 has a total of 80 claims pending in the application. There are 9 independent claims and 71 dependent claims.

#### ***Oath/Declaration***

2. The Applicant's oath/declaration has been reviewed by the Examiner and is found to conform to the requirements prescribed in **37 C.F.R. 1.63**.

#### ***Priority / Filing Date***

3. The Applicant's claim for foreign priority of British application No. GB 0319393.5 (filed on August 18, 2003) is confirmed. The Examiner takes the foreign filing date of August 18, 2003 into consideration.

#### ***Information Disclosure Statement***

4. As required by **M.P.E.P. 609(C)**, the Applicant's submissions of the Information Disclosure Statement dated October 10, 2006 and January 8, 2007 are acknowledged by the Examiner. The cited references have been considered in the examination of the claims now pending. However, Applicant is advised that there are at least two documents are cited with the wrong publication dates (see attached notes in the IDSs). As required by **M.P.E.P 609 C(2)**, a copy of the PTOL-1449 initialed and dated by the Examiner is attached to the instant Office action.

***Abstract***

5. The abstract of the disclosure does not commence on a separate sheet in accordance with 37 CFR 1.52(b)(4). A new abstract of the disclosure is required and must be presented on a separate sheet, apart from any other text.

6. The abstract of the disclosure is objected due to the use of implied language. Note that in the abstract, the language should be clear and concise and should not repeat information given in the title. It should avoid using phrases which can be implied, such as, "The disclosure concerns," "The disclosure defined by this invention," "The disclosure describes," etc... See MPEP § 608.01(b).

Note that in the abstract, Applicant cites "*A system for efficiently storing application data is disclosed...*" This citation clearly provokes the use of implied language. Appropriate correction is required.

***Drawings***

7. The drawings were received on May 9, 2005. These drawings are objected due to having no labels to clearly distinguish figure numbers corresponding with the description of drawings on page 5 of the specification.

***Claim Objections***

8. **Claim 29** is objected to because of the following informalities: unnecessary capitalization of the word '*Broker*' on line 9. Appropriate correction is required.

***Claim Rejections - 35 USC § 112***

9. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

10. **Claims 78-80** are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Regarding **claims 78-80**, the claimed method, system, and computer program product are deemed to be broad and indefinite since Applicant intends to claim his entire disclosure. The scopes of these claims appear to be limitless. Appropriate correction is required.

***Claim Rejections - 35 USC § 101***

11. 35 U.S.C. 101 reads as follows:

Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title.

12. **Claims 29-51**, and **78-80**, are rejected under 35 U.S.C. 101 because the claimed invention is directed to non-statutory subject matter.

Regarding **claim 29**, a “*system for storing data comprising a broker program for ...*” is being claimed. The claimed system appears to be directed to a software system itself, not a process occurring as a result of actually executing the software components, a machine programmed to operate in accordance with the software components, nor a manufacture structurally and functionally interconnected with the software components in a manner which enables the software components to carry out their

functionalities. The claimed system is also not a combination of chemical compounds to be a composition of matter. As such, it fails to fall within a statutory category. It is, at best, functional descriptive material *per se*.

**Claims 30-51** fail to resolve the deficiencies of **claim 29** since they only further limit the scope of **claim 29**. Therefore, **claims 30-51** are also rejected under 35 U.S.C. 101.

**Claim 79** presumably contains the same subject matters as **claim 29**, therefore, it is also rejected under 35 U.S.C. 101 for the same reasons presented above.

The claims above lack the necessary physical articles or objects to constitute a machine or a manufacture within the meaning of 35 U.S.C. 101. They are clearly not a series of steps or acts to be a process nor are they a combination of chemical compounds to be a composition of matter. As such, they fail to fall within a statutory category. They are, at best, functional descriptive material *per se*.

Descriptive material can be characterized as either “functional descriptive material” or “nonfunctional descriptive material.” Both types of “descriptive material” are nonstatutory when claimed as descriptive material *per se*, 33 F.3d at 1360, 31 USPQ2d at 1759. When functional descriptive material is recorded on some computer-readable medium, it becomes structurally and functionally interrelated to the medium and will be statutory in most cases since use of technology permits the function of

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the descriptive material to be realized. Compare *In re Lowry*, 32 F.3d 1579, 1583-84, 32 USPQ2d 1031, 1035 (Fed. Cir. 1994)

Merely claiming nonfunctional descriptive material, i.e., abstract ideas, stored on a computer-readable medium, in a computer, or on an electromagnetic carrier signal, does not make it statutory. See *Diehr*, 450 U.S. at 185-86, 209 USPQ at 8 (noting that the claims for an algorithm in *Benson* were unpatentable as abstract ideas because “[t]he sole practical application of the algorithm was in connection with the programming of a general purpose computer.”)

Further, Applicant embedded the entire disclosure as “... *described herein and with reference to the drawings*” in **claims 78-80**, hence failed to limit the scope of each of these claims. Therefore, **claims 78-80** are also rejected under 35 U.S.C 101 for being broad and indefinite..

### ***Claim Rejections - 35 USC § 102***

13. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

14. **Claims 1-2, 4, 6-10, 12, 18-25, 28-30, 32, 34-38, 40, 45-49, 52-55, 57, 59-60, 65, 70-74, and 77-80**, are rejected under 35 U.S.C. 102(b) as being



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anticipated by Clifton et al. (*Pat. No. US 4,310,883, published on January 12, 1982; hereinafter Clifton*).

Regarding **claim 1**, Clifton clearly shows and discloses a method of operating a data processing system, the system comprising one or more application programs requiring persistent data storage for data files of application data, a plurality of storage devices each accessible via a computer network to one or more computers executing said application programs, and a broker program (*Abstract and Figure 8*),

wherein the method comprises receiving, by means of said broker program, a request for storage of a data file of application data (*The first process or method step shown in the first block is to request a volume selection for storing the data set that requires a storage space. This request can be made by the primary host CPU 20 of the figures. The volume records for the volume group is then searched for all of the volumes that are eligible for storing the data set, [Column 22, Lines 59-64]*), and

selecting for said data file which of said storage devices will be used to store said data file in accordance with the characteristics of the application data to be stored, wherein said characteristics of the data to be stored include an expiry date, beyond which the application data is no longer required and may be deleted (*The access to the volume selected for the data set to be stored is to a volume with sufficient free space*

*(excluding reserved space) to allocate the data set in question. A volume is chosen for which the volume expiration date is equal to or exceeds, but is closest to, the expiration date of the data set to be stored, [Column 17, Lines 13-18]].*

Regarding **claim 28**, Clifton clearly shows and discloses a method of operating a data processing system to store data (*Abstract and Figure 8*), comprising:

receiving a request from an application program, among one or more application programs, for storage of a data file of application data (*The first process or method step shown in the first block is to request a volume selection for storing the data set that requires a storage space. This request can be made by the primary host CPU 20 of the figures. The volume records for the volume group is then searched for all of the volumes that are eligible for storing the data set, [Column 22, Lines 59-64]]*);

determining one or more characteristics of said application data, including an expiry date beyond which the application data is no longer required; monitoring the status of storage devices in a plurality of storage devices (*The access to the volume selected for the data set to be stored is to a volume with sufficient free space (excluding reserved space) to allocate the data set in question. A volume is chosen for which the volume*

*expiration date is equal to or exceeds, but is closest to, the expiration date of the data set to be stored, [Column 17, Lines 13-18]); and*

*selecting a storage device from said plurality of storage devices to store a data file of application data in accordance with the characteristics of the data to be stored and the state of said storage devices (The access to the volume selected for the data set to be stored is to a volume with sufficient free space (excluding reserved space) to allocate the data set in question. A volume is chosen for which the volume expiration date is equal to or exceeds, but is closest to, the expiration date of the data set to be stored, [Column 17, Lines 13-18]);*

*wherein said data file is stored on the selected storage device (The access to the volume selected for the data set to be stored is to a volume with sufficient free space (excluding reserved space) to allocate the data set in question. A volume is chosen for which the volume expiration date is equal to or exceeds, but is closest to, the expiration date of the data set to be stored, [Column 17, Lines 13-18]).*

Regarding **claim 29**, Clifton clearly shows and discloses a system for storing data comprising a broker program for receiving requests for storage of a data file of application data from one or more application programs requiring persistent data storage, and for selecting for said data file which of a plurality of storage devices, accessible to said one or more application programs and said broker program via a computer network,

will be used to store said data files (*Figures 1 & 3. Clifton further discloses the mass storage volume controller 22 also maintains the uses tables to control the activity of the storage area. One such table is a mass storage volume inventory table 28 (see Figure 3) which contains the group and volume records signifying the characteristics of the volume in the cartridge store 8, [Column 9, Line 65 → Column 7, Line 2]]*);

wherein said Broker program selects said storage device in dependence on the characteristics of the data to be stored and the state of said storage devices, wherein said characteristics of the data to be stored include an expiry date, beyond which the application data is no longer be required and may be deleted (*The access to the volume selected for the data set to be stored is to a volume with sufficient free space (excluding reserved space) to allocate the data set in question. A volume is chosen for which the volume expiration date is equal to or exceeds, but is closest to, the expiration date of the data set to be stored, [Column 17, Lines 13-18]]*);

such that said application data is stored in the allocated storage device as a data file (*The access to the volume selected for the data set to be stored is to a volume with sufficient free space (excluding reserved space) to allocate the data set in question. A volume is chosen for which the volume expiration date is equal to or exceeds, but is closest to, the expiration date of the data set to be stored, [Column 17, Lines 13-18]]*).

Regarding **claim 52**, Clifton clearly shows and discloses a system for storing data (*Figures 1 & 3*), comprising:

one or more application programs requiring persistent data storage for data files of application data (*Figure 9*);

a plurality of storage devices each accessible via a computer network to one or more computers executing said application programs (*Figure 1*); and

a broker program for receiving a request from an application program for storage of a data file of application data; and for selecting for said data file which of said storage devices will be used to store said data file in accordance with the characteristics of the application data to be stored and the state of the storage devices, the characteristics of the application data including an expiry date beyond which the application data is no longer required (*The access to the volume selected for the data set to be stored is to a volume with sufficient free space (excluding reserved space) to allocate the data set in question. A volume is chosen for which the volume expiration date is equal to or exceeds, but is closest to, the expiration date of the data set to be stored, [Column 17, Lines 13-18]*)).

Regarding **claim 54**, Clifton clearly shows and discloses a computer program product for controlling a computer in a data storage system, said computer being operable to receive requests from one or

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more application programs, running on one or more computers, and requiring persistent data storage for data files of application data, and operable to monitor a plurality of storage devices (*Figures 1 & 3*),

said computer program product comprising a recording medium readable by said computer, having program code stored thereon which when executed on said computer (*Figure 1*) configures said computer to perform the steps of:

receive a request for storage of a data file of application data from an application program (*The first process or method step shown in the first block is to request a volume selection for storing the data set that requires a storage space. This request can be made by the primary host CPU 20 of the figures. The volume records for the volume group is then searched for all of the volumes that are eligible for storing the data set, [Column 22, Lines 59-64]*), and

select for said data file which of said storage devices will be used to store said data file in accordance with the characteristics of the application data to be stored and the state of said storage devices, wherein said characteristics of the data to be stored include an expiry date, beyond which the application data is no longer required and may be deleted (*The access to the volume selected for the data set to be stored is to a volume with sufficient free space (excluding reserved space) to allocate the data set in question. A volume is chosen for which the volume expiration date is*

*equal to or exceeds, but is closest to, the expiration date of the data set to be stored, [Column 17, Lines 13-18]].*

Regarding **claim 77**, Clifton clearly shows and discloses a computer program product for controlling a computer in a data storage system, said computer program product comprising a recording medium readable by said computer, having program code stored thereon which when executed on said computer configures said computer (*Figures 1 & 3*) to perform the steps of:

receiving a request from an application program, among one or more application programs, for storage of a data file of application data (*The first process or method step shown in the first block is to request a volume selection for storing the data set that requires a storage space. This request can be made by the primary host CPU 20 of the figures. The volume records for the volume group is then searched for all of the volumes that are eligible for storing the data set, [Column 22, Lines 59-64]]*);

determining one or more characteristics of said application data (*A volume is chosen for which the volume expiration date is equal to or exceeds, but is closest to, the expiration date of the data set to be stored, [Column 17, Lines 13-18]]*);

monitoring the status of storage devices in a plurality of storage devices (*A volume is chosen for which the volume expiration date is equal*

*to or exceeds, but is closest to, the expiration date of the data set to be stored, [Column 17, Lines 13-18]);*

selecting a storage device from said plurality of storage devices to store a data file of application data in accordance with the characteristics of the data to be stored and the state of said storage devices, the characteristics of the application data including an expiry date beyond which the application data is no longer required (*The access to the volume selected for the data set to be stored is to a volume with sufficient free space (excluding reserved space) to allocate the data set in question. A volume is chosen for which the volume expiration date is equal to or exceeds, but is closest to, the expiration date of the data set to be stored, [Column 17, Lines 13-18]);*

wherein said data file is stored on the selected storage device (*The access to the volume selected for the data set to be stored is to a volume with sufficient free space (excluding reserved space) to allocate the data set in question. A volume is chosen for which the volume expiration date is equal to or exceeds, but is closest to, the expiration date of the data set to be stored, [Column 17, Lines 13-18]).*

Regarding **claim 78**, Clifton clearly shows and discloses a method of storing data substantially as described herein and with reference to the drawings (*Abstract and Figure 8*).



Regarding **claim 79**, Clifton clearly shows and discloses a system for storing data substantially as described herein and with reference to the drawings (*Figures 1 & 3*).

Regarding **claim 80**, Clifton clearly shows and discloses a computer program product for controlling a computer, in a system for storing data, substantially as described herein and with reference to the drawings (*Figures 1 & 3*).

Regarding **claims 2, 30, and 55**, Clifton further discloses monitoring, by means of the broker program, the remaining storage space available on each of said storage devices, to distinguish between in-use storage devices which have had data files written to them and empty storage devices which have not (*Volume groups can be assigned the attribute value of release/no release. After data set allocation, unused allocated space is released in cylinder quantities if the data set is not empty*, [Column 13, Lines 46-49]).

Regarding **claims 4, 32, and 57**, Clifton further discloses:

monitoring how much data is waiting to be written to each storage device, to detect an overload condition in the process of writing the data (*There exists certain instances where a volume may not be a very good candidate for the current request because there is a previous request using or waiting in the queue to use the volume in an exclusive fashion. These volumes are called job wait volumes. The selection of this volume*

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*will cause this request to wait for the conflicting request to be completed. If the WAIT flag is activated, this signifies that the volume is selected for a request that would cause this request to wait because the volume was not completely ready for selection, [Column 29, Lines 13-22]]); and*

*selecting, if an overload condition is detected for a storage device selected for storage, a different storage device for storage (From the volumes remaining, an attempt will be made to select a volume that is not a job wait volume. If any volumes exist that are not a job wait volume, then one of these volumes will be selected, [Column 29, Lines 60-64])).*

Regarding **claims 6, 34, and 59**, Clifton further discloses:

*storing, for each storage device, the latest expiry date of data files stored on that device, or of data files that are to be stored (A volume expiration date is calculated the first time a volume is selected to contain a data set after the volume is in a retention group. The volume expiration date is the date of the allocation plus a retention period, [Column 13, Lines 63-67]]); and*

*permitting application data to be stored on a storage device if its expiry date is within a predetermined range of said latest expiry date (each volume record from the group is checked one at a time to determine if the volumes are eligible to be selected for the current request according to the data set information. The comparators 42 check if the volume expires before the expiration date set for the data set, [Column 19, Lines 28-38]]);*

such that application data with similar expiry dates can be stored together and when such similar expiry dates have passed the storage device can be erased and re-used (*When the volume expires, all data sets residing on that volume may be destroyed. The expiration date of the volume can be nullified and that volume is now ready for reuse*, [Column 14, Lines 2-5]).

Regarding **claims 7, 35, and 60**, Clifton further discloses selecting another storage device for storage, if the expiry date of said application data is outside of the predetermined range of said latest expiry date (*each volume record from the group is checked one at a time to determine if the volumes are eligible to be selected for the current request according to the data set information. The comparators 42 check if the volume expires before the expiration date set for the data set*, [Column 19, Lines 28-38]. *The first decision is whether the volume is eligible to satisfy this request. If it is not eligible, the volume record is checked to see if it is the last volume in the group and, if not, the subsequent step is to get the next volume in this group and to examine that volume*, [Column 24, Lines 27-34]).

Regarding **claims 8, and 36**, Clifton further discloses storing for each of said storage devices a target expiry date, and selecting which of said storage devices to use in dependence on a comparison of said expiry date and said target expiry date (*each volume record from the group is checked one at a time to determine if the volumes are eligible to be*

*selected for the current request according to the data set information. The comparators 42 check if the volume expires before the expiration date set for the data set, [Column 19, Lines 28-38]. The first decision is whether the volume is eligible to satisfy this request. If it is not eligible, the volume record is checked to see if it is the last volume in the group and, if not, the subsequent step is to get the next volume in this group and to examine that volume, [Column 24, Lines 27-34]].*

Regarding **claims 9**, and **37**, Clifton further discloses preventing application data from being stored on a storage device, if the target expiry date for that storage device is earlier than said expiry date (*each volume record from the group is checked one at a time to determine if the volumes are eligible to be selected for the current request according to the data set information. The comparators 42 check if the volume expires before the expiration date set for the data set, [Column 19, Lines 28-38]. The first decision is whether the volume is eligible to satisfy this request. If it is not eligible, the volume record is checked to see if it is the last volume in the group and, if not, the subsequent step is to get the next volume in this group and to examine that volume, [Column 24, Lines 27-34]].*

Regarding **claims 10**, and **38**, Clifton further discloses preventing application data from being stored on a storage device if the target expiry date for that storage device is earlier than said expiry date by more than a predetermined margin (*each volume record from the group is checked one*

*at a time to determine if the volumes are eligible to be selected for the current request according to the data set information. The comparators 42 check if the volume expires before the expiration date set for the data set, [Column 19, Lines 28-38]. The first decision is whether the volume is eligible to satisfy this request. If it is not eligible, the volume record is checked to see if it is the last volume in the group and, if not, the subsequent step is to get the next volume in this group and to examine that volume, [Column 24, Lines 27-34]).*

Regarding **claims 12, 40, and 65**, Clifton further discloses after said latest expiry date has passed, erasing the contents of said storage device (*The volume expiration date is the date of the allocation plus a retention period. Nonspecific data set allocations will not allocate a data set to a volume if the expiration of the data set date exceeds that of a volume. When the volume expires, all data sets residing on that volume may be destroyed, [Column 13, Line 63 – Column 14, Line 3]).*

Regarding **claims 18, 45, and 70**, Clifton further discloses notifying said application program of the storage device used to store said data file as determined by said broker program, such that said application program can store means to identify the device (*The best volume selection means arranges the volumes from best fit to worst fit to select the volume required that best matches the requirements of the data set for the most efficient use of the volume storage available. The best volume records are*

*placed in a selected volume register means where they are transferred to a mass storage controller means for controlling the transfer of the data set information to the selected volumes, [Column 6, Lines 15-23]).*

Regarding **claim 19**, Clifton further discloses said data files are retrieved from said storage device by said application program directly via said computer network and without reference to said broker program (*The mass storage system responds to the program operating system of its host computers in the virtual direct access mode. That is, to the host computer, the mass storage system appears as a plurality of disk drives directly available to the host computer. The operating system of the host computer assigns a disk virtual volume to a system unit. When a virtual volume is mounted in the mass storage system, it is also assigned to a unit address. The virtual unit address is used to designate the logical address of each virtual volume and is used in staging data and in locating the data on a staging pack, [Column 2, Lines 52-58]).*

Regarding **claims 20, 46, and 71**, Clifton further discloses determining, by means of the broker program, the directory location for storage of said data file on said storage devices (*The selection process selects a storage volume according to the information describing the data set that is to be stored. The selection apparatus and process weighs the factors describing the data set and searches each virtual volume in a*

*specific group for the best storage location for the data set under consideration, [Column 5, Lines 11-17]).*

Regarding **claim 21**, Clifton further discloses creating, by means of said broker program, the directory entry for said data file in said directory location in anticipation of data being written to said file by the application program requesting storage (*The best volume selection means arranges the volumes from best fit to worst fit to select the volume required that best matches the requirements of the data set for the most efficient use of the volume storage available. The best volume records are placed in a selected volume register means where they are transferred to a mass storage controller means for controlling the transfer of the data set information to the selected volumes, [Column 6, Lines 15-23]).*

Regarding **claims 22, 47, and 72**, Clifton further discloses notifying, by means of the broker program, said directory location of said data file to said application program for storage by said application program (*The best volume selection means arranges the volumes from best fit to worst fit to select the volume required that best matches the requirements of the data set for the most efficient use of the volume storage available. The best volume records are placed in a selected volume register means where they are transferred to a mass storage controller means for controlling the transfer of the data set information to the selected volumes, [Column 6, Lines 15-23]).*

Regarding **claim 23**, Clifton further discloses the directory entry for said data file in said directory location is created by said application program prior to data being written by it (*The best volume selection means arranges the volumes from best fit to worst fit to select the volume required that best matches the requirements of the data set for the most efficient use of the volume storage available. The best volume records are placed in a selected volume register means where they are transferred to a mass storage controller means for controlling the transfer of the data set information to the selected volumes*, [Column 6, Lines 15-23]).

Regarding **claims 24, 48, and 73**, Clifton further discloses the state of said storage devices includes the current availability of such devices for data to be written thereto (*From the volumes remaining, an attempt will be made to select a volume that is not a job wait volume. If any volumes exist that are not a job wait volume, then one of these volumes will be selected*, [Column 29, Lines 60-64]).

Regarding **claims 25, 49, and 74**, Clifton further discloses the state of said storage devices includes the amount of free space available in said storage devices (*The SPACECK program calculates the free space on the volume taking into account the reserved space on each volume. A volume is rejected if there is not sufficient space in the volume and the process returns to look at the next volume*, [Column 27, Lines 10-18]).



Regarding **claim 53**, Clifton further discloses an Application Program Interface running on the one or more computers to pass commands to and from the broker program and the application program (*A special command is issued to interface with the storage system containing the virtual volume location. The request is placed on the storage volume control queue which in turn sends a request to a volume selection module where the actual selection process takes place, ([Column 5, Lines 6-11]).*

***Claim Rejections - 35 USC § 103***

15. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

16. **Claims 3, 5, 11, 15-17, 31, 33, 39, 43-44, 56, 58, 61-64, and 68-69**, are rejected under 35 U.S.C. 103(a) as being unpatentable over Clifton et al. (*Pat. No. US 4,310,883, published on January 12, 1982; hereinafter Clifton*) in view of Leonhardt (*Pub. No. US 2002/0188592, filed on June 11, 2001; hereinafter Leonhardt*).

Regarding **claims 3, 5, 31, 33, 56, and 58**, Clifton does not explicitly disclose said selecting step comprises selecting in-use storage devices in preference to empty storage devices.

Leonhardt discloses if the data attributes as defined by storage management policy indicates that the data set is a candidate to reside on a tape cartridge, then a tape cartridge with expired data on it must be selected to write the data set to. The tape cartridge selected can be one which is completely void of data sets, or the tape cartridge could contain some data sets which have not yet expired and the space available on that tape cartridge can be used to write the current data ([0059]).

It would have been obvious to a person skilled in the art at the time the invention was made to incorporate the teachings of Leonhardt with the teachings of Clifton for the purpose of providing a management system which presents to host processors a virtual data storage image having a desired storage attribute for a particular data storage application by combining physical data storage devices in an arrangement suitable for providing the desired storage attribute ([0001] of Leonhardt).

Regarding **claims 11, 39, and 64**, Leonhardt further discloses after said data file has been written to said storage device, preventing said file from being modified or deleted until said expiry date has passed *(management software 42 further performs data expiration processing. It is typical for data sets to have an inherent expiration date which defines a point in time at which the data contained in the data set is no longer valid. When data sets reach their expiration data, they will be deleted, [0060])*.

Regarding **claims 15, 43, and 68**, Leonhardt further discloses the characteristics of the data to be stored include the application program which requires its storage (*an outboard storage manager is operable with the plurality of physical data storage devices for presenting to the host processor a virtual data storage image having a desired data storage attribute for a particular data storage application*, [0011]).

Regarding **claims 16, 44, and 69**, Leonhardt further discloses said characteristics of the data to be stored include the size of the application data (*The attributes or storage policies of the individual data sets must be understood by outboard storage manager 10 in order to make intelligent decisions about placement and movement of the data sets. Some relevant data set attributes and policies include data set size*, [0044]).

Regarding **claim 17**, Leonhardt further discloses writing said application data to and/or reading said application data from said storage devices directly by means of said application programs via said computer network (*an outboard storage manager is operable with the plurality of physical data storage devices for presenting to the host processor a virtual data storage image having a desired data storage attribute for a particular data storage application*, [0011]. *See Figure 1 for the client/server structure*).

Regarding **claim 61**, Clifton further discloses storing for each of said storage devices a target expiry date, and selecting which of said

storage devices to use in dependence on a comparison of said expiry date and said target expiry date (*each volume record from the group is checked one at a time to determine if the volumes are eligible to be selected for the current request according to the data set information. The comparators 42 check if the volume expires before the expiration date set for the data set, [Column 19, Lines 28-38]. The first decision is whether the volume is eligible to satisfy this request. If it is not eligible, the volume record is checked to see if it is the last volume in the group and, if not, the subsequent step is to get the next volume in this group and to examine that volume, [Column 24, Lines 27-34]].*

Regarding **claim 62**, Clifton further discloses preventing application data from being stored on a storage device, if the target expiry date for that storage device is earlier than said expiry date (*each volume record from the group is checked one at a time to determine if the volumes are eligible to be selected for the current request according to the data set information. The comparators 42 check if the volume expires before the expiration date set for the data set, [Column 19, Lines 28-38]. The first decision is whether the volume is eligible to satisfy this request. If it is not eligible, the volume record is checked to see if it is the last volume in the group and, if not, the subsequent step is to get the next volume in this group and to examine that volume, [Column 24, Lines 27-34]].*

Regarding **claim 63**, Clifton further discloses preventing application data from being stored on a storage device if the target expiry date for that storage device is earlier than said expiry date by more than a predetermined margin (*each volume record from the group is checked one at a time to determine if the volumes are eligible to be selected for the current request according to the data set information. The comparators 42 check if the volume expires before the expiration date set for the data set, [Column 19, Lines 28-38]. The first decision is whether the volume is eligible to satisfy this request. If it is not eligible, the volume record is checked to see if it is the last volume in the group and, if not, the subsequent step is to get the next volume in this group and to examine that volume, [Column 24, Lines 27-34]*).

17. **Claims 13-14, 41-42, and 66-67**, are rejected under 35 U.S.C. 103(a) as being unpatentable over Clifton et al. (*Pat. No. US 4,310,883, published on January 12, 1982; hereinafter Clifton*) in view of McMurdie et al. (*Pat. No. US 6,882,795, filed on October 30, 2000; hereinafter McMurdie*).

Regarding **claims 13, 41, and 66**, Clifton does not explicitly disclose said characteristics of the data to be stored include a classification of the content of said application data.

McMurdie discloses once the client application 202 has been provided enumerated formats, a format has been selected as active, and the client application 202 has been provided the application format

interface identifications, the disc master interface 222 then provides the client application 202 with an enumerator that enumerates the recording devices 280 supported by the system, and presently connected to the system ([Column 5, Line 66 → Column 6, Line 5]).

It would have been obvious to a person skilled in the art at the time the invention was made to incorporate the teachings of McMurdie with the teachings of Clifton for the purpose of recording data with minimal data interruption, even with very large and complex audio and video files, by selecting recording devices based on the selected data format ([Column 3, Lines 50-55] of McMurdie).

Regarding **claims 14, 42, and 67**, McMurdie further discloses:

storing for each of said storage devices, a target content type (As shown in Figure 3, in addition to the *IRedbookDiscMaster 224* and the *IJolietDiscMaster 226* described above, several additional application format interfaces are configured to the exemplary system. The application format interfaces illustrated include *IISO9660DiscMaster 227a* for ISO9660-format data, *IUDFDiscMaster 227b* for UDF-format data, *ICDExtraDiscMaster 227c* for CD Extra-format data, *IPhotoCDDiscMaster 227d* for photographic data, *ICD3DiscMaster 227e* for audio data, *IVideoCDDiscMaster 227f* for video data, [Column 5, Lines 19-25]);

comparing said classification of the content of said application data and said target content type (*The disc master interface 222 provides the*

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*client application 202, as represented through dashed line 210, an enumerator that enumerates the formats supported and provides identification of the application format interfaces present, [Column 47-51]);*  
and

preventing said application data from being stored in a storage device if the target content type for that device and the classification do not match (*The disc master 220 contains all of the application format interfaces that are supported by a system, [Column 5, Lines 1-2]). It is well inherent that for files with unsupported format, the files will not be stored in these devices).*

18. **Claims 26, 50, and 75**, are rejected under 35 U.S.C. 103(a) as being unpatentable over Clifton et al. (*Pat. No. US 4,310,883, published on January 12, 1982; hereinafter Clifton*) in view of Gotoh et al. (*Pub. No. US 2003/0079084, filed on March 28, 2002; hereinafter Gotoh*).

Regarding **claims 26, 50, and 75**, Clifton does not explicitly disclose the state of said storage devices includes the rate at which data is being read from and/or written to such devices.

Gotoh discloses the storage control device 10 may be connected with a plurality of host processors 20. In this case, the response time upper limit value of each the files will be stored for each host processor, and storage device(s) to where the files are to be stored will be selected for each host processor 20, or, when there is an input/output request of a

certain file from the host processor 20, the upper limit value of the file and the response time of each storage device will be compared and the processing priority of the relevant input/output request will be determined according to the comparison result ([0059]).

It would have been obvious to a person skilled in the art at the time the invention was made to incorporate the teachings of Gotoh with the teachings of Clifton for the purpose of optimizing the storage control process by selecting a storage device for storing a file based on its response max value ([Abstract] of Gotoh).

19. **Claims 27, 51, and 76**, are rejected under 35 U.S.C. 103(a) as being unpatentable over Clifton et al. (*Pat. No. US 4,310,883, published on January 12, 1982; hereinafter Clifton*) in view of Basham et al. (*Pub. No. US 2003/0050729, filed on September 10, 2001; hereinafter Basham*).

Regarding **claims 27, 57, and 76**, Clifton does not explicitly disclose monitoring the status of said storage devices, detecting when new storage devices have been added, and making these available for storage.

Basham disclose in Figure 8 the process of adding a physical drive including the steps of making this physical drive ready and available for storage by configuring it for a storage library ([0066]).

It would have been obvious to a person skilled in the art at the time the invention was made to incorporate the teachings of Basham with the



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teachings of Clifton for the purpose of providing an automated data storage library which stores portable data storage cartridges in storage shelves and transports the portable data storage cartridges between the storage shelves and the data storage drives for mounting and demounting the portable data storage cartridges at the data storage drives ([0002] of Basham).

***Conclusion***

20. These following prior arts made of record and not relied upon are considered pertinent to Applicant's disclosure:

Thurlow et al. (Pat. No. US 5,917,489) teaches system and method for creating, editing, and distributing rules for processing electronic messages.

Shoup et al. (Pub. No. US 2002/0147734) teaches archiving method and system.

The Examiner requests, in response to this Office action, support(s) must be shown for language added to any original claims on amendment and any new claims. That is, indicate support for newly added claim language by specifically pointing to page(s) and line no(s) in the specification and/or drawing figure(s). This will assist the Examiner in prosecuting the application.

When responding to this office action, Applicant is advised to clearly point out the patentable novelty which he or she thinks the claims present, in view of the state of the art disclosed by the references cited or the objections made. He or she must also show how the amendments avoid such references or objections See 37 CFR 1.111(c).

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***Contact Information***

21. Any inquiry concerning this communication or earlier communications from the Examiner should be directed to Son T. Hoang whose telephone number is (571) 270-1752. The Examiner can normally be reached on Monday - Friday (7:30 AM – 5:00 PM).

If attempts to reach the Examiner by telephone are unsuccessful, the Examiner's supervisor, Christian Chace can be reached on (571) 272-4190. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Son T Hoang/

Examiner, Art Unit 2165

April 30, 2008

/S. P./

Primary Examiner, Art Unit 2164

Art Unit: 2165

/Christian P. Chace/

Supervisory Patent Examiner, Art Unit 2165